

CLAIMS

What is claimed is:

A digital incident recording apparatus comprising:

means for continuously capturing actual visual scene that comes within the vicinity of said apparatus wherein said means for capturing visual scene is achieved by an image capturing unit,

means for buffering up a plurality of captured visual scene having finite number of storage elements over-written repeatedly using a first-in-first-out mechanism such that a finite storage can be used to hold a plurality of said visual scene continuously;

means for preserving said buffered scenes long enough to be useful after an incident has occurred;

means for triggering a preservation of said buffered scenes, wherein said triggering is a mechanism chosen from the group consisting of software mechanism, firmware mechanism, hardware mechanism and combinations thereof, wherein said firmware or software mechanism comprises of programmable logic instructions that fire off a signal in responding to an external event, wherein said hardware mechanism comprises at least one sensor capable of sending out a signal upon detecting a physical event, wherein said physical event can be a physical impact, sudden change in momentum, shock wave, sudden change in sound wave amplitude, manual activation and combinations thereof; and

means for providing overall operational control of said apparatus.

2. A digital incident recording apparatus as recited in claim 1 further comprises means for temporally storage using a volatile memory device.

3. A digital incident recording apparatus as recited in claim 1 further comprises means to draw power from a power source to provide continued operation,

1 wherein said power source is chosen from the group consisting of a battery, a
2 dc power supply, an ac power supply and a combination thereof.

3
4 ~~1.~~ A digital incident recording apparatus as recited in claim 1 wherein said
5 *Sub A5*
6 means for preserving buffered scenes comprises of a persistent storage unit
7 chosen from the group consisting of a persistent memory device, a volatile
8 memory device having a continued power supply so as to retain its contents, a
9 non-memory persistent storage media and a combination thereof.

10 ~~2.~~ A digital incident recording apparatus as recited in claim 4 wherein said
11 *Sub H5*
12 means for buffering up said captured scenes is achieved by feeding said
13 captured scenes into said persistent storage unit.

14 ~~3.~~ A digital incident recording apparatus as recited in claim 2 wherein said
15 *Sub B3*
16 means for buffering up said captured scenes is achieved by feeding said
17 captured scenes into said volatile memory unit.

18 ~~4.~~ A digital incident recording apparatus as recited in claim 1 further comprises:
19 *Sub A6*
20 additional said image capturing unit that captures scenes of side and
21 back views to include activities of the operator when said apparatus is to be
22 used inside a transportation system.

23 ~~5.~~ A digital incident recording apparatus as recited in claim 1 further comprises:
24 *Sub B6*
25 additional said image capturing unit that captures scenes of side and
26 back views, wherein said additional unit has its own separate said means for
27 buffering up said captured scenes and means for preserving said buffered
28 scenes.

29 ~~6.~~ A digital accident recording apparatus as recited in claim 1 wherein said
30 *Sub A7*
31 image capturing unit is used to capture scenes of forward view as well as
backward view to include the activities of said operator.

1
2 10. A digital incident recording apparatus as recited in claim 1 further comprises
3 means for manually triggering said preservation of captured scenes,
4 wherein said manually triggering can be an action selected from the group
5 consisting of taking snap shots of visual scene, taking a sequence of
6 continuous images of visual scene, and freezing the activity of said
7 continuously capturing visual scene so as to prevent existing said scenes in
8 said buffer of being replaced by new scenes in order to preserve existing
9 said scenes.

manually triggering

10
11 11. A digital incident recording apparatus as recited in claim 1 further comprises
12 a housing means to protect said persistent storage from being destroyed by
13 environmental factor, wherein said factor includes temperature, impact,
14 shaking, electrical shock and moisture.

15
16 12. A digital incident recording apparatus as recited in claim 1 further comprises
17 means for capturing sound wave in synchronization with the said
18 captured visual scene;
19 means for buffering said captured sound wave using said first-in-first-
20 out mechanism in the same manner as for said visual scene; and
21 means for preserving said buffered sound wave in the same manner as
22 for said visual scene.

sub 12

23
24 13. A digital incident recording apparatus as recited in claim 11 further comprises
25 an installation means which allows said apparatus to be taken out of
26 an installation base and to be used as a recording apparatus outside of a
27 transportation system, wherein said installation means is selected from the
28 group consisting of attaching said apparatus onto a surface and inserting said
29 apparatus into a housing unit large enough to hold said apparatus.
30

1 14. A digital incident recording apparatus as recited in claim 11 further comprises
2 an installation means which allows the said apparatus to be taken out
3 of an installation base and to be used as a hand-held recording apparatus,
4 wherein said installation means is selected from the group consisting of
5 attaching said apparatus onto a surface and inserting said apparatus into a
6 housing unit large enough to hold said apparatus.

7 *B6*
8 15. A digital incident recording apparatus as recited in claim 1 wherein said
9 means for overall operational control comprises of a control unit chosen from
10 the group consisting of a micro-processor, a micro-controller, a DSP, a PAL,
11 an EPLD, a FPGA and a programmable logic circuit.

12
13 16. A method for digitally recording incidents using a finite storage for capturing
14 events that may occur at any time within a long time span comprises steps of:
15 continuously capturing the actual visual scene in real-time and
16 converting said scene into digital form;
17 controlling the operation and timing of said capture process;
18 continuously buffering up a plurality of captured images using a first-
19 in-first-out mechanism so that said buffered images can be preserved when
20 needed; and
21 triggering a permanent preservation of a plurality of frames of
22 said buffered images.

23
24 17. A method for digitally recording incidents as recited in claim 16 wherein
25 said permanent preservation of a plurality of frames of visual scenes is
26 achieved by prohibiting *older* said images from being erased and replaced by
27 newer images such that said plurality of frames stored are composed of a
28 number of images captured so many seconds before, during and after said
29 triggering.
30

18. A method for digitally recording incident as recited in claim 16 further comprises the step of:

detecting an external event so as to generate said triggering, wherein said event is chosen from the group consisting of physical impact, sudden change of momentum, sudden change of sound amplitude, manual activation, unusual occurrence of objects in said captured images, distance between said objects, movement of said objects and a combination thereof.

19. A method for digitally recording incidents as recited in claim 16 further comprises the step of:

capturing rear and side view scenes to include the activities of the operator of a transportation system;
buffering said rear and side view scenes using said first-in-first-out mechanism; and
preserving said buffered images when said triggering occurs.

20. A method for digitally recording incidents as recited in claim 16 further comprises the step of:

capturing surrounding sound wave corresponding to said visual scene;
buffering said captured sound wave using said first-in-first-out mechanism in the same manner as for said visual scenes; and
preserving said buffered sound wave when said triggering occurs.

Sub
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Sub
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ADD
A.10

ADD
B.10